

SELF-HELP cottagers check 150 lakes

To help safeguard our heritage of thousands of clear, sparkling lakes the Ministry of the Environment started in 1972 the SELF-HELP program for recreational lakes.

The aim of this program, which involved at the beginning only 12 lakes, is to encourage residents, cottagers, marina and resort owners to be aware and to understand water pollution problems in their own environment.

Their voluntary assistance also helps the Ministry to identify and to solve water quality problems.

Today more than 150 lakes are involved in the SELF-HELP program. Half of these are located within Environment Ontario's Central Region. In the program, Environment Ontario supplies Secchi discs and sampling devices for chlorophyll a to the cottagers. The black and white colored Secchi discs are used to determine the depth to which light penetrates the water of the lake. Since light penetration is affected by the density of algae suspended in the water, Secchi disc readings indicate the

amount of algae in a given lake, assuming that the effect of other particulate matter on the light transmission of the water is negligible.

Both, Secchi disc readings and chlorophyll a samples, help Ministry biologists to determine the degree of nutrient enrichment of the lake. With this information a change in the quality of the water can be identified and steps to control these changes can be taken.

Ideally, samples and readings are taken weekly as long as the lake is ice-free, and are forwarded to Environment Ontario's laboratory in Toronto for analysis. In winter the results of all tests are summarized and reports on the findings are returned to the participants and released to the public.

Additional information on the SELF-HELP program can be obtained by writing to:

Ontario Ministry of the Environment,
Central Region,
150 Ferrand Drive,
Don Mills, Ont.
(Telephone: 416-424-3000)



ENVIRONMENT ONTARIO LEGACY

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(Photo: Environment Ontario)

Environment Ontario gets sophisticated air van



Environment Ontario's new mobile air monitoring unit, one of the most sophisticated mobile laboratories in North America to collect and analyse air quality samples, will be on display in Toronto's City Hall Square, June 20-24 during the Air Pollution Control Association's 70th annual conference.

The vehicle is inspected by Conference Chairman W. Brad Drowley, executive director, Resource Development, and Air Resources Director Alan Harris, both of Ontario's Environment Ministry. One of the Ministry's best known programs is the Air Pollution Index and Alert System now operating in major urban areas across the Province.

(Photo: Hans Eijcken)

Kerr urges cottagers: "Get involved!"

In Ontario there are over 250,000 cottages used regularly by about a million people. During the summer an additional large number of Canadians spend weekends and vacations in resorts, cabins, and campgrounds.

But "our enjoyment of Ontario's natural resources depends very much on a delicate balance between man and the natural environment", said Environment Minister George A. Kerr recently to the participants

on the Second Annual Cottage Country Conference, held in Toronto.

Unfortunately this balance is difficult to maintain because cottage development is not spread evenly, and some lakes attract more people than others.

Lake capacity study
To safeguard Ontario's outdoors, Environment Ontario is involved together with the Ministries of Housing, of Natural Resources, and of the Interior in a five year Lake Capacity Study. This study in its second year, is designed to establish a comprehensive approach to the control, development of cottage and involves all aspects of the environment — wildlife, water quality, public use and other matters.

But shoreline development is only one of the problems concerning cottagers and En-

vironment Ontario. Minister Kerr named others:

- the disappearance of certain sportfish species in some lakes,
 - the extensive growth and decay of aquatic plants,
 - the inadequate disposal of human wastes,
 - elevated levels of some trace contaminants in sport fish.
- "The Ministry has action programs to deal with all of these," Minister Kerr said, "wherever it is practical, the owners involved and need have a role in solving

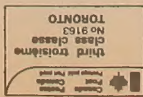
definition of problems

first step toward any means is to know the problem years determining the water quality in any body of water, and knowledge understanding any that occur.

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Chief Librarian Toronto Public Library
Don Mills, Ontario
Robert Library

Lottery funds for environmental health projects

The Ontario Government has allocated \$5 million from "The Provincial" Lottery funds for projects related to environmental health. Environment Minister George Kerr announced recently.

"These additional funds will augment on-going environmental health programs in the Ministries of Environment, Health and Labour. Environment Ontario's share will be directed to urgent projects not previously possible under existing budgets — not only in research but also in restoration of environmental quality," said Mr. Kerr.

Two projects have already been planned by the Ministry under this program:

1. Abandoned mine tailings will be identified and cleaned up to prevent contamination of water tables.
2. A study of alternative water disinfection methods.

Individuals and groups are eligible for financial support provided the necessary technical expertise and equipment are available and terms of the public tendering process can be met.

To assist in pinpointing highest priority proposals, Environment Ontario's Research Advisory Committee will issue a list of projects considered to be the most urgent.

"However, we're open to suggestions and want to encourage initiative, therefore, unsolicited proposals will be considered on the same basis as projects on our priority list."

Guidelines for evaluating and selecting projects are as follows:

- Projects should be practically-oriented, cost effective and directly related to the solution of serious or urgent environmental health problems;
- Environment Ontario will continue to identify needs and areas of interest, set priorities and call for proposals. However, unsolicited proposals will be considered on the same basis;
- Projects should not be an extension of regular Ministry programs;
- Projects will be carried out by contract unless a clearly defined benefit can be demonstrated for in-house work;
- Maximum duration of any single project, including report presentation, must not exceed three years;
- Liaison will be maintained with the Ministries of Labour and Health to avoid duplication, exchange information and facilitate the development of joint projects;
- The Research Advisory Committee will review and assess proposals and make recommendations for selection;
- Contractors will provide progress reports and a final report.

Small spills—great damage

"Generally smaller oil spills are less spectacular than major marine oil spills, but the total volume spilled is great and produces greater environmental damage in any one year than Torrey Canyon type disasters," said Garnet H. Kay, supervisor of Contingency Planning for the Ontario Ministry of the Environment, at the 5th International Oil Spill Conference held recently in New Orleans.

To deal with the great number of small spills on the Great Lakes and other navigable waters the Canadian Government and the oil industry have formed in 1973 a Consortium on Oil Spill Training. The Consortium has produced and distributed four 26-minute videotape cassettes dealing with the prevention and control of small and intermediate spills. Two more cassettes are in production.



Paul Cockburn, (left) Central Region Director for the Ontario Ministry of the Environment, and the Hon. George Kerr, Ontario's Minister of the Environment, (centre) tour private properties on Niagara Street to view the commencement of a soil removal program being undertaken in the vicinity of lead processing plants in Metro Toronto. The \$700,000 project is designed to remove lead contaminated soil from about 60 properties in the area. The contaminated soil will be disposed at the Beare Road landfill site. The clean-up program is expected to be completed before the summer. (Photo: Hans Eysenck)

Air pollution authorities meet

Topics ranging from how polar bears in the Arctic could become contaminated with PCBs (polychlorinated biphenyls) to fine particulate matter in haze that helps us to appreciate the beauty of a sunset will be among subjects discussed in the course of 60 technical sessions when the Air Pollution Control Association meets in Toronto, June 20-24, 1977.

The international association's 70th annual conference

will be held at the Sheraton Centre Hotel. It is the largest conference of its kind held annually in North America with over 200 exhibits and 4,000 representatives from industry, science and government taking part.

The keynote address on trans-boundary air pollution will be given by Romeo LeBlanc, Canada's federal Environment Minister, followed by

Royal honors to F.K. Hare

F. Kenneth Hare, Director of the Institute for Environmental Studies at the University of Toronto, has been awarded one of the highest honors of the famed Royal Geographical Society of Britain, the Patron's Medal. A geographer of international reputation, Dr. Hare will receive the Medal "for discoveries in Arctic geography" June 13 in London, England.

As the 1977 recipient, Dr. Hare will join the ranks of historical personalities such as Admiral Richard E. Byrd, the famous polar explorer and Lincoln Ellsworth, the great Arctic navigator, as well as Sir John Hunt, leader of the 1953 Mount Everest expedition.

a panel discussion by senior federal, provincial and state officials.

Conference Chairman W. Brad Drowley, executive director, Resource Development, Environment Ontario, reports that exhibit space is already totally booked and a record attendance expected. In spite of new U.S. tax regulations affecting conference attendance outside the U.S.A., pre-registrations are above 1976 levels.

Kerr urges cottagers: (continued from pg. 1)

Since 1971 hundreds of Ontario cottagers have been involved in the Ministry's key monitoring activities under the SELF-HELP program. In this program information on water clarity and algae growth is collected to give Ministry experts a clear picture of the productivity and basic characteristics of lakes. It will continue, and the Ministry's Central Region's staff is prepared to add as many new lakes to the project as cottagers can handle.

Minister Kerr invited all cottagers to get involved in monitoring and in protecting the future of their lakes.

Under another program aimed at the protection of the cottage areas, Environment Ontario samples lakes and evaluates sanitary facilities on properties around the lakes. Over 20,000 properties were checked up to now, and the program continues advising owners of their problems and on methods available for correction.

Lake waters are safe

Of special concern in Ontario are the phantom polluters, — mercury, PCBs and Mirex.

Minister Kerr emphasized that "these pollutants are not a threat to drinking water, nor do they affect the normal use of Ontario Lakes and rivers, including bathing and boating."

The first discovery of mercury in fish in Lake St. Clair led to immediate abatement measures. A steady reduction in mercury levels can now be measured as a result of these actions.

Mirex, primarily detected in Lake Ontario fish, has led to control measures which are under way. To alleviate the more complex situation given by the contamination of fish with PCBs, both Ontario and federal authorities are committed to phase out the use of this chemical.

"Much of our knowledge of these three contaminants stems from the increased research and analysis capability in our new

laboratories and an extensive sampling program designed to take advantage of these capabilities," the Minister said.

Source still unknown

However, the same extension of sampling and analysis has also produced information of direct concern to cottagers — the presence of mercury in fish at unexpected levels where there is no known source of contamination, said the Minister.

Following up on these discoveries, the Ministry has:

- analysed water and sediment samples
- analysed effluent and sludge from industrial sources and sewage treatment facilities
- analysed drinking water supplies from municipal plants,
- monitored for possible airborne contamination,
- undertaken additional fish sampling of a wide range of species.

"A considerable amount of this activity," the Minister said, "is directed toward establishing the source of this mercury contamination," but at this time there is still no clear indication of any man-made source.

"If this sampling ultimately shows an artificial source of mercury contamination, our regional staff will get abatement measures under way immediately." But, "when fish are contaminated by natural sources, Ontario fishermen will have to accept the fact that little can be done to make fish from these lakes safe to eat."

Volunteer help welcome

The Federation of Ontario Cottagers Associations and the Ontario Federation of Anglers and Hunters have volunteered to assist Environment Ontario and the Ministry of Natural Resources in collecting fish samples for analysis. "We have worked out most of the details of how it will work and we are taking full advantage of this welcome and timely offer," said Minister Kerr. "This voluntary

assistance will strengthen our program particularly in catching smallmouth bass."

This work, however, is still only part of the Ministry's overall contaminants program. "We are continuing our sampling and analysis programs in a number of other areas and as we accumulate and interpret this information, we will keep you up to date," promised the Minister. "As a convenient reference guide, a comprehensive catalogue is being prepared which covers the latest information on a Province-wide basis. This will be brought up to date regularly as part of our normal service."

Future plans

Environment Ontario is also planning for the future. In co-operation with the federal government, Environment Ontario contributes to the preparation of Canada's new Environmental Contaminants Act designed to control hazardous chemicals before they are used.

In addition, Environment Ontario is setting up a central unit for monitoring, research and control of hazardous chemical contaminants such as PCBs, mercury, lead and asbestos.

Concluding, Minister Kerr expressed the hope "that we have got past the panic stage and that the information we issue on contaminants no longer appears with newspaper headlines proclaiming so-called poisonous playgrounds."

"In Ontario," the Minister said, "fishing is as good and safe as it is anywhere else in the world. In fact, for the most part it is better and safer. The main reason is," he said, "because we know more about our waters and what's in them, because we have the best scientific support, and because we have put a lot of effort into finding out. And there is nothing that we can't beat in the long run, especially if the people involved are prepared to pitch in and work on it."

NOTES

THE 1976 GROUP AWARD

of the Imperial Tobacco Environment Program has been awarded to Energy Probe of Toronto. A prize of \$10,000 accompanies this award.

THE POLLUTION CONTROL ASSOCIATION

has appointed Tom and Sandra Davey to handle its secretarial and administrative duties.

Mr. Davey has won many awards for environmental action. Mr. Davey began his career in London, England, as a secretary in the Canadian High Commissioner's Office. Since

then she has edited many environmental reports for consultants and the federal government.

METRIC UNITS

will be used in the specifications for all new water and sewage works scheduled for construction after January 1, 1978, announced Environment Minister George A. Kerr. While the Ministry fully realizes that some materials needed for these plants won't be available in metric by that date, it is the Ministry's aim to encourage suppliers to convert as soon as possible.

Sewage composting - a new solution to an old problem

Sewage is potentially dangerous, and at best, unpleasant to have around. In larger communities where it is removed by a well working sewage disposal system these dangers do not become visible. But the situation changes radically when we move to summer cottages in areas where standard disposal systems are not installed.

There are many solutions to the problem of the disposal of human waste in areas not served by sewage systems. Some of them are as old as humanity - others have become available only recently. All of them are described in a publication "Unsewered Toilets" being published by Environment Ontario which will be available in Government book stores and through Cottagers Associations.

The newest member of the unsewered toilet family, the composting toilet, has found much more interest among cottagers. Classified by an amendment of the existing regulations, among the Class 1 unsewered toilet systems, the composting toilet does not require Ministry of the Environment approval for its installation.

Decomposition with air

The principle of the composting toilet is simple. Like the manure pile beside the farmer's barn it allows organic materials to decompose in the presence of air. During this process about 90 per cent of the volume of the waste is dissipated in the form of carbon dioxide and water vapour, but harmless gases. The remainder is compost, valued as garden fertilizer.

The composting toilets are compact, less expensive than septic systems and generally, but not always, easy to install.

At the start they need some attention. Depending on their size they will, if properly looked after, achieve a steady state at which they continuously admit waste and supply compost, within six months to two years. Some of the models available use a little electric power to aid aeration and for heating to keep the aerobic process going even in cold weather.

They have some disadvantages. They can not be used for the disposal of waste water and of other household garbage, with the exception of small amounts of vegetable matter often need to keep up aeration. They also are a good

breeding ground for flies that can not be treated by normal disinfectants or lime. Both remedies would kill the bacteria essential for decomposition. But the manufacturers of composting toilets supply biodegradable pesticides designed for this purpose.

Good fertilizer

The compost produced in these toilets can safely be used as fertilizer on garden vegetables, although direct application to edible parts is not recommended. There is no limit to its application to flowers and shrubs.

Composting toilets are available in small and large units - in Ontario mostly smaller units have been installed in the cottage country up to now. These smaller units consist essentially of a box not much larger than a portable toilet, equipped with a vent pipe that must be led outdoors.

To speed up the composting process, a small electric resistance unit is provided as a heater and a fan is installed to help move air through the composting matter. The removal of mature compost every six months or so is not an unpleasant chore, if everything works well.

Most of the small composting toilets achieve their steady state when they are nearly full. This means that their contents are prominently displayed when the lid is raised. A few handfuls of grass cuttings strewn onto the surface may help not only aesthetically, but also to loosen things up and allow air a better access.

Fluctuations in use

More serious problems arise with the fluctuation of use. After a well attended party, the collecting bin may overflow, and there is no easy solution to this problem.

Large composting units require a basement in which a large (up to 8 ft x 8 ft x 4 ft) tank can be installed. Connection between toilet and tank is by a straight drop pipe of large diameter. A vent pipe, operating like a chimney, eliminates odors.

The main problem of the larger units is, again, the aeration of their contents. It can be helped along by the addition of some organic waste - food scraps, vegetable parings, a fair amount of cellulose - paper towels, kleenex - and even floor sweepings.

In many cases, composting toilet systems are the best solution for cottages. They are simple and, if properly attended, efficient. They work because a population of healthy micro-organisms prosper under choice conditions of warmth and moisture. A cottage owner concerned about his own comfort must, however, be ever mindful of theirs.

One of the questions which worries many Ontario cottagers is whether "their lake" can take the continuous addition of newcomers, anxious to share the joys (and sorrows) of life in the great Canadian outdoors. Is there a way to determine how big a population a natural lake can take without endangering its pristine waters?

The ability of a lake to withstand recreational use without significant changes in water quality depends on a number of factors such as the amount of nutrients, principally phosphorus, flowing into it from natural sources. Other factors are the geology of the area, the lakes mean depth and the rate at which its waters are exchanged.

Water clarity

Water clarity is one of the most important characteristics from an aesthetic point of view. While colour has some effect on it, most important is the amount of algae growing in the lake.

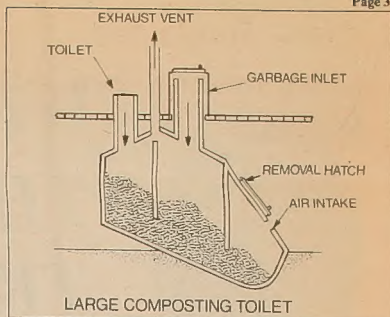
The factors mentioned above determine how much algae grow in a lake and hence how clear the water will be. The amount of algae is related to the lake's "trophic" status, that is its productive state. Clear lakes with rocky and sandy bottom are unproductive or oligotrophic. Muddy shallow waters, rich in weed growth and with marshy shores are generally eutrophic. In between lies the mesotrophic stage.

The succession of a lake through the various stages is a natural event, but it can be accelerated by dense human population in the drainage area. It can also be retarded by an effective control of the causes of water quality deterioration. The factor of most concern is the phosphorus input to the lake from human activities such as sewage discharges, fertilizing lawns and clearing of forests.

Phosphorus contents

Lake Ontario was considered, for example, to be in the mesotrophic stage in 1967. Without phosphorus control it would have become eutrophic by 1986. If 95% of all phosphorus input into Lake Ontario is removed it may revert to the youthful oligotrophic state by the same year, 1986.

The total phosphorus content of a lake depends partly on natural input through precipitation and dry fallout.

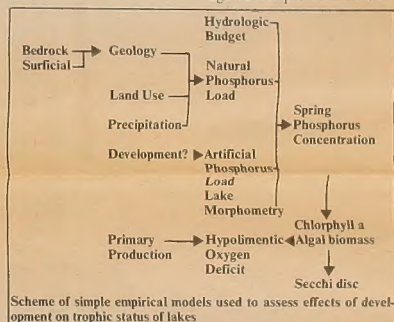


Limits of cottage development

Its bigger part, however, may be generated by the conditions in the lake's drainage area. It depends on the use of the land - forests will cause much less phosphorus input than farmland - on the density of the population in the drainage basin and on the type of sewage disposal facilities used. The control of the non-natural phosphorus input is the most important factor in the improvement of a lake's condition.

depends on the lake's mean depth and on the lake's water budget. This is the "flushing rate" at which the water in the lake is exchanged due to inflow and outflow, precipitation and evaporation. The mean depth and the flushing rates of most lakes in southern Ontario are established and are available from the federal Ministry of Natural Resources Lake Inventory.

Data on the long term average runoff per unit of the



Scheme of simple empirical models used to assess effects of development on trophic status of lakes

A significant test was taken in 1974 when Environment Ontario published a "Manual for Calculating the Capacity of a Lake for Development". At this time the third printing of this manual is sold out, and the Ministry's Water Resources Branch is preparing a fourth, revised edition.

A formula is available

The formulas in the manual combine the factors governing the algae growth (expressed as chlorophyll *a* in the water) so that numerical predictions can be made of the likely changes in algae, and hence water clarity, due to phosphorus inputs from human activities. The manual also stresses the need to prevent extra phosphorus from reaching the water. If this can be done, orderly development will not damage the water quality of the lake.

Most of the information needed to determine the population capacity of a lake is easy to obtain.

The lake drainage area can be determined from a topographic map. It is the area within a line drawn on the map by connecting the highest points of land surrounding the lake.

Natural watercourses can absorb a certain amount of phosphorus. This ability

drainage area surrounding a lake and precipitation and evaporation rates can also be obtained from Canada's Land Inventory 1966, Ontario Government Bookstore.

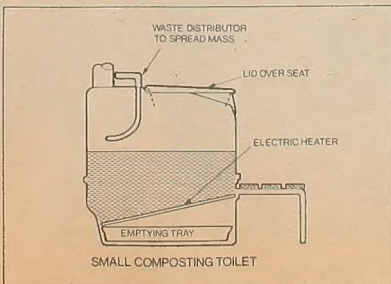
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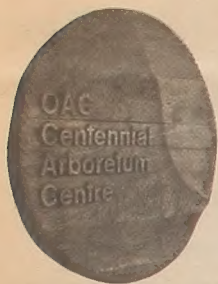
Together they allow the determination of the predicted spring total phosphorus concentration. From this the average chlorophyll *a* concentration in summer can be predicted, and the Secchi disc transparency of the water can be estimated.

All the data collected and their relationships are translated in the manual into mathematical formulae, which allow the calculation of the permissible total phosphorus concentration and the permissible artificial phosphorus load on the lake.

As 0.80 kg of phosphorus are discharged yearly by each person living on its shores and considering the average length of time cottagers spend at their cottages, the potential artificial phosphorus loading on the lake drainage area can then be established.

The manual calculations can determine whether this potential impact can be allowed or whether alternatives such as less development or controls on phosphorus discharges must be implemented.





WHERE ALL THE WORLD'S TREES MEET

By Connie Saunders

For the past five years, the University of Guelph has been growing a combination classroom, conservation area and research centre all on one 330-acre parcel of land.

The University's Arboretum, funded in part

by \$130,000 in grants from Environment Ontario, contains close to 3,000 different species of plants which are studied by students from 60 courses at the university, students from other universities, international scientists and other interested groups.



Robert Hilton, (far left) director of the Guelph Arboretum, chats with (left to right) Alan Watson, Sarah Lowe, Dr. John Ambrose and Keith Laver on the steps of the Arboretum Centre.



Sarah Lowe, research co-ordinator, examines a packet of seeds scheduled for planting.

The arboretum in Guelph, like Ontario's other facilities in Ottawa and Hamilton, is an excellent place to study the effects of urban growth on plants because of its location in the heart of a developing community. Its highly trained and experienced staff includes four scientists, each with their own interests and functions.

"Like all arboreta, ours will take 25 to 50 years to mature, depending on the quality of staff and equipment," said Dr. Robert Hilton, director of the arboretum. Dr. Hilton is responsible for the overall plan and function of the arboretum. A professor at the University of Guelph for many years, he has taken two sabbatical leaves to hunt throughout certain temperate climate areas for many different kinds of woody plants.

"Plants in the main arboretum collections don't grow at random," he remarked. "Before a single plant was obtained, the arboretum was planned on paper." "Plants are grouped according to their species or use," he continued. "For instance, birch trees are planted together as are shade trees and trees of Canadian origin. Those planted in a designated section become a part of the arboretum's formal collection."

Before planting, the tree or shrub is kept in the arboretum's nursery. Here, seeds,

cuttings or small plants from all parts of the world are grown until they are strong enough to be transplanted. The arboretum's nursery also determines which plants and species will be kept for the formal collection.

The nucleus of the arboretum is the Ontario Agricultural College Centennial Arboretum Centre. Finished in 1974, this building commemorates the 100th anniversary of Guelph's agricultural college, one of the largest and most respected on this continent.

The centre was designed by Raymond Moriyama, the same architect who designed the Ontario Science Centre. Built into a hill, the structure complements the natural landscape. Large windows seem to cover more than half the walls, and make you feel that you are outdoors.

One of several natural woodlands within the arboretum is known as the Victoria Woodland. It has three nature trails developed by the arboretum's naturalist, Alan Watson. These are open to the public and are ideal for warm-weather walks or snow-shoeing and cross country skiing. "Eventually, there'll be a nature interpretive building and a sugar shack near the woodland," said Mr. Watson. "It will be used to teach appreciation for nature and to demonstrate tree tapping and



Dr. John Ambrose, responsible for proper plant identification and Sarah Lowe walk through the Arboretum's gravel pit to select a site for future tests.



The Arboretum's main building melts into the landscape — according to the design idea of architect Raymond Moryama.

maple sugar making to anyone interested, especially school children.

Visitors to the Victoria Woodland should come to the arboretum centre first," he continued. "There, printed guides are available to tell you what to look for on the trails."

Sarah Lowe is the arboretum's research co-ordinator. "There are many projects going on at one time, and the overlapping of research must be avoided."

"The variety of interest and expertise in the arboretum projects needs to be coordinated, to develop a well balanced research program" she explained.

One research project concerns the composting of leaves in a metal drum which can be turned over as required. The compost from this drum will be compared to compost from a conventional compost heap by an evaluation of their effects on the growth of plants.

A project more visible in spring than in winter is research into the ability of plants to grow on slopes and in badlands. This experiment is being conducted in the arboretum's small gravel pit and on a substantial landfill site nearby where various plants will be used to reclaim the sterile subsoil.

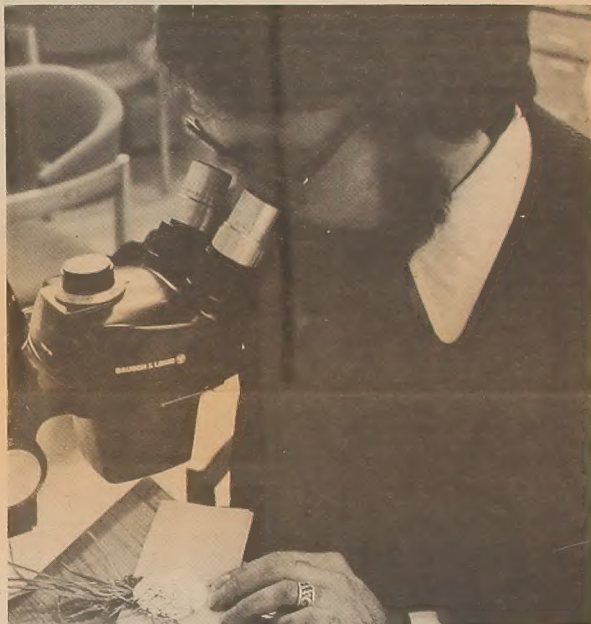
The curator of the Guelph Arboretum is Dr. John Ambrose. He is responsible for the correct identification of each

plant before it is accepted in the formal collection and for the overall control of the hundreds of woody plant species being established in the formal collection. He also does this for the herbarium, a catalogued collection of woody and herbaceous plants used for student projects and courses.

Keith Laver, a member of MOE's Environmental Assessment Board and Past Chairman of the Pesticides Advisory Committee, provides strongly experienced liaison between Environment Ontario and the Guelph Arboretum. He received his horticultural degree from the University of Guelph and still feels a strong attachment to the institution.

"Environment Ontario is proving leadership in another aspect of environmental protection by supporting this arboretum," he said. "An undertaking of this kind is not the responsibility of naturalists or horticulturalists alone. It requires an integrated approach involving many environmentally concerned disciplines of science."

The University of Guelph Arboretum is essential to the preservation of Ontario's environment. Without trees and other woody plants, some of our most important natural resources would be lost. Besides, trees make up a high percentage of the beauty of our environment, and we must strive to keep Ontario this way.



Alan Watson studies the root structure of a shrub.



Dr. John Ambrose and Alan Watson, naturalist, consult a herbarium to help in the identification of a plant.



Dr. John Ambrose and Sarah Lowe study the experimental composting process.

All photos: Tessa Buchan

Environmental education . . . with Jane Thomas Educational Resources Co-ordinator

Comparing plant and animal life

Teacher Background:

One of the main concerns of scientists who study water pollution is how to evaluate the degree to which pollution has occurred. The methods they use can be placed in two major groups, chemical and biological.

The biological lists can be separated into two main groups: (i) microscopic (ii) macroscopic. The microscopic tests often involve bacteria which may be harmful, a long period of time and expensive equipment. For these reasons microscopic tests are less suitable for children to perform. The macroscopic tests involve the capture and observation of invertebrate animal life and primitive plant life such as algae. These objects can be observed with the eye or with a low powered microscope. In studying these types of plant and animal life, scientists try to evaluate the quantity, i.e. the number of each particular species and the quality, i.e. the number of different species present. As pollution increases, the number of a particular species increases, while the number of different species decreases. This change occurs because the pollution inhibits the animal life that would normally control that particular species. Certain types of animal life can therefore be used as indicators of the various degrees of pollution.

Some indicator organisms which the pupils could learn to recognize are:

- (i) Hard Water — insect larvae of May and Black Flies.
- (ii) Partly Polluted Water — grey leeches of the non-blood sucking type. These animals eat detritus or non-living matter.
- (iii) Highly Polluted Water — aquatic worms (oligochaetes). These animals require a very low oxygen supply in order to live.

Obtaining Organisms from Water:

(i) Animal Life:

In Hard, Flat-Bottomed Areas:

Have the pupils construct a flat-bottomed net from coat hanger wire, muslin, tape and a broom handle.

When using this net move upstream agitating the net up and down with a bouncing motion at the same time. Remove the net periodically and place any captured specimens in pill vials or baby food jars. Use a piece of masking tape as a label to identify the species and location from which it was collected.

In Soft-Bottom Areas:

Use a shovel to remove a sample of the bottom.

(ii) Plant Life:

Have the pupils construct a plankton net from a coat hanger, nylon stocking with a test tube fastened in the toe and a strong line.

Use the line to tow the net upstream or if there is sufficient current, allow the current to pull the net downstream.



Students use a seine net and a bucket to gather organisms for an on-the-spot study.

After a few minutes or other suitable period of time, remove the test tube and examine the green material which has been collected. Place the contents in a baby food jar for microscopic examination when the pupils return to the classroom. Some measure of the degree of pollution could be obtained by comparing the relative amount of green algae collected in various locations. Generally speaking, the greater the amount the greater the pollution.

(iii) Turbidity:

Turbidity refers to the clearness of the water. Substances such as soil, chemicals, bacteria and plant life form small particles which become mixed or suspended in the water. If they do not dissolve they can make the water turbid. Turbidity is not always an indicator of pollution. Conversely, a stream can be completely clear and still be highly polluted.

To test a stream or pond for turbidity, have the pupils nail a white floor tile perpendicular to the end of a broom handle or other similar piece of wood. Mark a scale on the stick in centimeters. Lower the tile into

the water until it disappears from view. Measure the depth. The average of the two measurements can be used as an indicator as to the degree of turbidity. Raise it slowly until it appears again. Measure this depth on the scale on the stick.

Reprinted with permission from the booklet "Pollution" by D.F. Wentworth, J. C. Couchman, J. C. MacBean and A. Stecher. This booklet which deals with garbage, air, water and noise may be obtained for \$1.00 from the Board of Education for the City of Hamilton, P.O. Box 558, Hamilton, Ontario.

...and here's Mademoiselle Can-Can!!!

Mademoiselle Can-Can symbolizes the Ministry of the Environment's new campaign — Join the Waste Watchers.

A Waste Watcher is someone, who knows the problems associated with waste disposal and who is willing to undertake some activity to reduce the amount of garbage he and other Ontario residents generate.

In Canada, each man, woman and child produces roughly four pounds of garbage each day and spends roughly \$25.00 per year through taxes on its collection and disposal. In addition, improper waste disposal practices lead to a loss of valuable land and natural resources.

The Waste Watchers Campaign has been launched in May with an explanatory letter to every school principal in the province. Every student who undertakes some waste watching activity such as participation in a clean-up day, a recycling drive or an anti-litter program will be sent a "Waste Watchers" button. And in December of 1977, plaques will be awarded to one school and one classroom, at both primary and secondary school levels, which have made a major contribution to the Waste Watchers movement in Ontario.

To assist in preparing lessons on waste, the Ministry has prepared some educational materials — fact sheets, brochures and posters. These are available in limited quantities without charge. An audio-visual presentation, aimed at students in senior public or secondary schools, is available on a two-week lend basis.

To obtain this material, write:

Education Section
Information Services Branch
Ministry of the Environment
135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

Young artists involved

For the past two months over 1,200 children in the Gravenhurst and Huntsville areas have been busy working on posters, essays, poems and other projects which depict their interest in the environment.

This bustle of activity is the result of a Ministry of the Environment campaign, run in conjunction with the Muskoka Board of Education, to increase the environmental awareness of young people.

Between February 1st and March 24th of this year, staff of "Environment Ontario's Gravenhurst and Huntsville offices visited over 2,600 students in grades five to eight. This involved 46 separate presentations. The Ministry of environment staff discussed pollution, the Ministry's programs, the responsibilities of the individual and showed films. They also suggested that the students undertake some sort of a project to prove their concern for the environment.

Beginning in April, the environmental officers will return to the schools, collect the

projects and distribute crests and certificates to the students, whose teachers feel are deserving of recognition.

The children who appear to have put the most thought and effort into their presentations will spend a day on the Severn River in a Ministry boat. A special stop will be made for lunch.

Bill Balfour, the district officer for Muskoka-Haliburton, is pleased with response and the efforts of his staff. "At first some of our people were a little reluctant to get up and speak in front of a classroom. However, they worked out a good routine and the kids loved it."

"I sat in on a couple of the sessions and everyone seemed to be enjoying the program as well as learning from it. I was surprised at the number of mature, logical questions which the children asked. Today's students are certainly becoming more knowledgeable in the area of environmental concern than they were a few years ago."



"We are off to a good start..."

The deputy minister's office on the 14th floor of Environment Ontario's building at 135 St. Clair Avenue West in Toronto has not been altered due to the change in occupancy. The only noticeable new piece of furniture is a neatly framed diploma identifying the new occupant as a member of the Order of Good Times.

The owner of the Good Times membership — Kenneth H. Sharpe fits the simple, clean and efficient mood of the office well which is not very surprising — he had assumed command within a few weeks of his 30th anniversary in the Ontario Civil Service.

Kenneth Sharpe had decided on his career early in his life, while still a fourth year student of engineering at the University of Toronto by selecting the "Municipal Option", especially public health engineering.

On graduation he started immediately in his chosen profession with the Department of Health of Ontario. He

returned to university shortly to take a master's degree in Public Health Engineering, and rejoined the civil service as district engineer with the Department of Health.

In this capacity he worked throughout the Province — and through all the changes that occurred in Public Health Engineering during the past 30 years.

When the OWRC was formed in 1957, its nucleus consisted of the Department of Health's health engineers and Kenneth Sharpe was one of them. "The depression era and World War II had left a tremendous backlog of civil health projects undone," he recalls, "and it was at the time one of the main tasks of the OWRC to bridge this gap, and to go on with the program of making Ontario a healthier place to live. It succeeded — primarily thanks to the funding made available to municipalities through the OWRC and also by bringing together experts committed to public health and

will to carry sometimes new, sometimes more direct responsibilities for the job."

It was during these years that Kenneth was given the honorary membership in the Order of Good Times, an organization of community leaders which originated in Nova Scotia, for his involvement in the Halifax water works project.

The formation of the new Department of the Environment in 1972 enlarged the responsibilities for a healthy Ontario still further. Kenneth Sharpe was, at the time, right in the thick of things. "Our objective in the new Department was very clear," he remembers, "as was the decision to bring all the problems of water, air and land under one umbrella. But there was a lot of rethinking to do, to break up traditional organizations and mold them into a new one, at the same time distributing key people outside the main office to the regions. Deputy minister Biggs had a very fundamental



CHANGE AT THE HELM

Ken Sharpe, George Kerr and Everett Biggs enjoy a joke while looking at the Deputy Minister Book just signed by Mr. Sharpe after the swearing-in ceremony.

(Photo: Tessa Buchan)

and tremendous job ahead of him."

And the job was done. "We lost some time, all our energy was at first concentrated on the reorganization. This is still going on, to some extent. But all the difficulties have been overcome, and we are off. . . . We now have the organization, the structure, the men to do the

job," said deputy minister Sharpe.

"Our main job in the future as I see it, is to make the new Environmental Assessment Act work. How we sell this new and fascinating idea, how we operate it will be very critical for the future of the Ministry, and for the future of the Province and its people."

Take-off on the morning dew

An interview with Everett Biggs by Robert Koci

Six months in the field

Mr. Biggs joined the Ontario Department of Agriculture as an assistant agricultural representative. He was on the field staff for six months when a senior Branch Director was needed. He was there — at the right time, with the right knowledge acquired through postgraduate studies in economics and marketing and a degree in animal science — and he got the job.

Once established in this position he found that the Ontario Milk marketing system needed reorganization. He studied, developed a new system for the pricing of milk and helped the industry to move toward a co-ordinated marketing structure.

In 1961 Mr. Biggs became Deputy Minister of Agriculture. He continued in his efforts, achieving, among many other things, an improvement of the milk marketing system, often against the feeling of the conservative farmers, helped to establish the Ontario Food Council and an aggressive program of export sales, to establish the Ontario Agricultural Research Institute and to develop a close working relationship with the other provinces.

Man on the spot

In 1972 the Department of the Environment was formed, and Mr. Biggs was the man on the right spot again.

No controversy

"My task was to get the people from the OWRC and the other environmentally oriented groups that joined the new Ministry to work together. But while I expected controversy, there was none. Somebody said at the time, that they were tired of fighting against integration into a Ministry."

"But from the first day on I had the ultimate in co-operation, especially with the help of Dave Caverly, the former general manager of the OWRC."

Serving under a succession of Ministers, beginning with James Auld, then William Newman and finally George A. Kerr, Mr. Biggs helped to translate the high public expectations for the Environmental Protection Act into reality. Major programs were started and followed up in solid waste management, contaminant detection and measurement, enforcement of the abatement programs in existing plants, stringent pollution control requirements for new industry, the provision of water and sewage treatment facilities to municipalities and in many other fields. At the same time work was progressing on the formulation of the Environmental Assessment Act, now one of the most advanced pieces of legislation in environmental control in North America.

New attitudes

But perhaps more important than all the administrative progress achieved in the short time of Everett Biggs' tenure was the change of attitude of the people toward environmental matters.

"Since the emotional years 1968-1970, which were fraught with simplistic approaches to environmental problems, people's environmental concerns have matured. I can well remember how, during my first years in office, hardnosed businessmen listening to well-known speakers talking in the Rotary Club on environmental matters, reacted with yawns," he said.

By now everybody, including Rotary Club members, realize that pollution is a real danger that involves the health of everyone. There is much more of a personal awareness of environmental matters today.

"Environmental concern may not be the top issue of our political life today as it was in the early seventies; but it lies very close to the surface. If the government would slip in its task of safeguarding the environment, it would very quickly face very strong criticism again."

"The strong approach taken by the Ministers Newman and Kerr concerning, for example, the pulp and paper industries, are really saving the Government of Ontario from very much criticism."

The battle for clean water and air, however, is not over by far. Mr. Biggs believes that he has helped to establish the direction our continuing quest for a clean Ontario should take. And he keeps looking forward:

The battle is not yet over

"The main concern of any environmental policy in the years ahead is the recognition and the control of the use of hazardous substances and contaminants," he said. "During the past few years we have learned that the 'phantom' chemicals the Minister refers to often are a real danger to our waters. We have become aware of their existence because our analytical procedures have become more sophisticated."

"We now also have the Environmental Contaminants Act, and Environment Ontario is the contact Ministry for this federal Act in our Province. We have no choice — governments on all levels, including the U.S. — must bring the use of these hazardous materials under control."

"One might argue, that the progress of technology demands the use of those dangerous materials. But we are in reality not doing very badly in our way of living, and I do not think that it is really necessary to suddenly introduce all these chemicals without thorough research and testing."

Search for the source

The question still waiting for a solution is, of course, how to control some of the environmental problem materials when we don't know as yet the source of contamination — in mercury for example.

"I understand that some of the lakes where fish with excessive mercury content were found

overlie a geological formation extending from Belleville to Kalabogie. This formation contains ore with a high content of mercury in the interstitial rock," explained Mr. Biggs. "This mercury is leaching into the lakes in minute quantities. In addition, the natural gasification of the earth crust liberates some 50,000 to 150,000 metric tons of mercury yearly into the atmosphere. Some of it falls back into the lakes and rivers."

"But there also are other possibilities. I have, for example, suggested that all old train wrecks, and the materials spilled by them be located. For many years mercury was used extensively in mining in Ontario. The Ministry will also be looking at all old mine locations. The mercury, cyanides, and other materials these old miners used may now be slowly finding their way into our rivers."

Let people choose

"Another problem left to my successor will be continuing public education. I am slowly being converted to the feeling," Everett Biggs said, "that our primary task is to tell people what the dangers are and then give them the choice to behave accordingly."

"I do a lot of fishing myself," he added, "but I think that all the fish I eat are not nearly as harmful as some other bad habits have . . ."

And Everett Biggs' own future?

"Several friends suggested to me that I go into politics," he answered. "Others advised psychiatric care before I quit my Deputy Minister job. But after over 15 years as DM I feel that I have contributed as much as I can contribute to administration. I am very concerned about our current national situation, and as I have an intimate knowledge of the working of all our governments — federal, provincial and municipal — I believe I can, given the opportunity, make a significant contribution in the political arena."

The small aircraft was flying at 1500 feet over low-hanging clouds towards Barrie, Ontario when the pilot ran out of both: daylight and gas.

He was lucky. Within gliding distance he spotted a freshly plowed field, with the furrows lined up in the direction of the wind.

A short turn and a sideslip brought the craft down. It touched, slid and came to rest as neatly as a duck landing on the village pond.

The pilot and the three passengers got out and checked the craft. They could not find a scratch on it. Surprising — since the aircraft was on floats.

The next problem was how to get the bird back into the air. The pilot solved the problem easily.

He returned early the next morning with a crew. They removed everything they could from the aircraft and moved it to an adjoining pasture. They put just enough gas into the dry tanks for a take-off and a short hop to Lake Simcoe.

Then the pilot revved-up the engine. His helpers gave the craft a little push and seconds later the float-plane took off on the morning dew.

The pilot of the aircraft was Everett Biggs. The flying story he told me on his last day in his office on the 14th floor of the Environment Ontario Building in Toronto bears the characteristics which were repeated throughout his career: he made the right decision at the right time based on the right knowledge, and then followed through. He got things going again and again — often enough with the help of the right amount of luck.

Take, for example, Mr. Biggs' entry into the Ontario Civil Service following active military duty with the infantry and then the armored corps in the U.K. and in Europe and the completion of his studies at the Ontario Agricultural College in Guelph.

Water, sewage services:

\$44 million for NW-Ontario

Over \$44 million is being spent by the Government of Ontario on the construction, expansion and installation of water treatment and water pollution control projects in Northwestern Ontario. Environment Minister George Kerr, and Northern Affairs Minister Leo Bernier announced recently during a tour of the Kenora, Ear Falls and Red Lake areas.

Construction projects estimated at \$35.5 million will be undertaken in the Kenora, Keewatin and Jaffray and Melick area. In order to meet the present and future needs of the area, the Ontario Ministry of the Environment is to construct and finance a new water treatment plant and expand the existing plant in Kenora — with the two plants serving the three municipalities. Population of the area is now 15,500 and is expected to increase to 21,800 by 1996.

Further construction in Kenora will include extensions to water and sewage services in seven areas. In Keewatin, water distribution and sewage collection systems will be constructed, while in Jaffray and Melick

similar services will be installed, all lying into the central sewage and water plants in Kenora.

Projected completion date for the servicing of the entire area is 1979, with portions of the projects already under way in both Kenora and Keewatin.

In Ear Falls, the Province of Ontario, through the Ministry of the Environment, has already installed sewer and water systems. The \$4,200,000 program planned for this township will include expansion of the sewage treatment plant and the upgrading of potable water quality. Improvement of the distribution system and installation of a water tower are also to be incorporated in the services being provided for the residents of Ear Falls.

At Red Lake over \$4.6 million will have been spent in the community since 1975 to clean up pollution problems in the area. Additional facilities to be constructed in Red Lake will include a 400,000-gallon storage tank, extension of the sewage collector and water distribution systems, new pumps and modifications to the existing water pumping station.

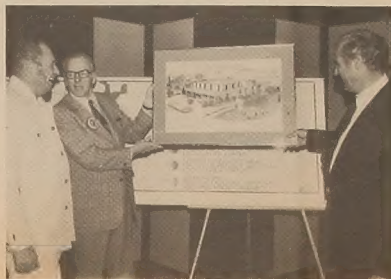
Both Mr. Bernier and Mr. Kerr toured the expansion areas in the Northwest, met with municipal and civic representatives, and presented each of the communities with a framed artist's rendering of the major new facility in each of the municipalities.

"These environmental improvements will not only safeguard the health of the citizens in the District of Kenora," stated Mr. Bernier, "but will also assure the probable future expansion of the municipalities and townships."

Mr. Kerr, Minister of the Environment, commented to the municipal representatives: "Through the help of my Ministry, we are assuring that the Kenora area, Red Lake, and Ear Falls, will be ready to welcome expansion and have available the necessary water and sewage treatment capacity. The Government of Ontario is anxious and pleased to underwrite these projects because we realize the future is in the northern part of this Province. By installing and expanding the sewage and water treatment facilities, we assure that Northwestern Ontario can and will assimilate increased population and industry. Services are the key to expansion and these are being provided in the Northwest."



Municipal officials in the Lake-of-the-Woods area discuss the water and sewage treatment projects with The Hon. Leo Bernier (centre), Minister of Northern Affairs, and The Hon. George Kerr, Q.C. (right), Ontario's Minister of the Environment. With his back to the camera is Reeve Ed Alcock, of Jaffray and Melick, and to the left are Mayor Udo Romstedt, of Kenora, and Mayor Bob Kahoot, of Keewatin.



Kenora Mayor Udo Romstedt (left) obviously likes the artist's rendering of the new water treatment plant for the Kenora-Keewatin and Jaffray and Melick areas. Making the presentation is The Hon. George Kerr, Q.C. (centre), Ontario's Environment Minister, and The Hon. Leo Bernier, recently appointed Minister of Northern Affairs.

Hull goes clean

Ontario and Quebec can expect some significant advances in coping with environmental issues common to the two provinces. Environment Minister George Kerr reported after a lengthy meeting recently with Quebec Environment Minister Marcel Leger. "Mr. Leger has made a commitment to proceed with construction of the proposed sewage and water treatment facilities to serve the Hull region," Mr. Kerr said. "These environmental services have been a contentious issue and the subject of lengthy negotiations between the two provinces and the federal

government. The new facilities will have a significant effect on water quality in the Ottawa River." Construction will start this spring with completion expected in 1979 or 1980.

The pulp and paper industry in both provinces is a significant source of environmental concern, Mr. Kerr said. "In both provinces we are dealing with both old mills and new, in most cases operated by the same companies. It is important that Ontario and Quebec present a common front on this issue and I am encouraged by Mr. Leger's agreement on this issue. It's a good step forward."

Drainage can be controlled

Four years of study have established that urban drainage in Ontario can be controlled. In the future, the Urban Drainage Subcommittee will therefore concentrate its work on a program of policies for the implementation of these solutions, said G. H. Mills, Director of the Water Resources Branch of Environment Ontario.

Mr. Mills was speaking at the Modern Concepts for Urban Drainage Conference held recently in Toronto. The well attended conference was sponsored by the Urban Drainage Subcommittee of the Canada-Ontario Agreement on Great Lakes Water Quality. Runoff can be controlled by suitable design of new developments, the control of erosion and sediments from construction sites, a thorough review of the existing urban drainage systems and the proper treatment of stormwaters.

The policy of runoff control will concentrate on new developments especially in low-lying reaches and streams. The objective of this control will be to restrict runoff after completion of the development to its former natural levels. To achieve this, stormwater management will have to be considered at the earliest possible stage in the planning of the development.

Retroactive runoff control is now being studied by many municipalities. Because the original design of developments did not foresee this need,

control can now be achieved generally only by channel improvements.

The control of erosion and sediment transport will deal mainly with material eroded and transported from construction sites. The amount can be restricted by a reduction of vegetation removal and by the trapping of erosive materials. There are a few jurisdictions which now have top-soil and erosion control legislation, and their experience will be very valuable in the formulation of future policies.

Older drainage systems will have to be reviewed and analyzed, especially when an extension of the existing sewage treatment works is being considered. The tools for such detailed old system reviews are now available, and methods for reducing combined sewer overflow and programs to fit the needs of municipalities can now be established.

In some areas of Ontario, the use of rivers and lakes calls for a special consideration of discharge quality. In most cases sedimentation will remove most of the contaminants. In some others effluent desaturation or the addition of chemicals for the removal of suspended material and phosphorus will be necessary. A blanket policy statement in such cases is not realistic. Most municipalities, however, recognize these areas and initiate programs for the protection of the environment.

The findings of the Subcommittee are summed up in the Manual of Practice on Urban Drainage and in the proceedings of the conference, both available from Douglas F. Rhodes, Environment Canada, Canada Centre for Inland Waters, P.O. Box 5050, 867 Lakeshore Rd., Burlington, Ont., L7R 4A6.

CALENDAR OF EVENTS

June 6-8 — Ontario Water Works Equipment Association, Holiday Inn, City Centre, Tower, London, Ont. (H. C. Greer, Neptune Meters Ltd., 3526 Lakeshore Blvd., Toronto, M5W 1N7)

June 5-8 — Ontario Section, AWWA, annual conference, Holiday Inn, London, Ont. (Arthur Varcoe, 3190 Mavis Rd., Mississauga, Ont. L5C 1T9)

June 20-24 — Air Pollution Control Association, annual meeting, Sheraton Centre, Toronto (L. H. Rogers, 4400 Fifth Ave., Pittsburgh, Pa., 15213)

June 26-29 — Canadian Public Health Association, annual conference, Hotel Vancouver, Vancouver, B.C. (Gerald H. Dafoe,

1335 Carling Ave., Suite 306, Ottawa, Ont. K1Z 8N8)

July 14 — 5th Year Review of the Great Lakes Agreement, Venus Room The Constellation Hotel, Toronto.

July 15 — 5th Year Review of the Great Lakes Agreement (second sitting), Confederation College, Thunder Bay.

August 2-7 — Canadian Institute of Public Affairs, annual conference, Geneva Park Conference Centre, Geneva Park, Ont. (Brid Munsch, 20 Eglinton Ave. E., Suite 203, Toronto, Ont. M4P 1A9)

August 14-18 — Canadian Parks/Recreation Association, annual conference, Hotel Toronto, Toronto, Ont. (W. R. Green, c/o CP/RA, 333 River Road, Vanier City, Ont.)



Ministry of the Environment

Hon. George A. Kerr
Minister
K. H. Sharpe
Deputy Minister

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